

**UNIVERSITY OF NAIROBI**  
**DEPARTMENT OF METEOROLOGY**  
**ANNUAL REPORT**

1. GENERAL INFORMATION

This report covers the period from October 2008 to October 2009.

- (i) The undergraduate and postgraduate students sat for their examinations between 8<sup>th</sup> and 20<sup>th</sup> June 2009.
- (ii) The Department's external examiner was Prof. S.B.B. Oteng'i from Masinde Muliro University of Science and Technology. Prof. Oteng'i examined all the examinations offered during the academic year.
- (iii) Service courses to students in the Schools of Physical Sciences and Biological Sciences, College of Architecture and Engineering and College of Agriculture and Veterinary Sciences continued to be offered by the Department
- (iv) Higher Awards

**MSc in Agrometeorology:**

Chabvunguma, Stanley David – *Assessment of Maize crop water requirements and production under climatic change in Central and Southern Regions of Malawi*

**PhD in Meteorology:**

Nyakwada, William - *Predictability of East African Seasonal Rainfall with Sea Surface Temperature Modes*

(v) Programs offered in Meteorology

- B.Sc. in Meteorology
- B.Sc. (Atmospheric Science Option)
- Postgraduate Diploma (PGD) in Meteorology
- PGD in Aviation Meteorology
- PGD in Operational Hydrology
- M.Sc. in Meteorology
- M.Sc. in Agrometeorology
- M.Sc. Aviation Meteorology
- PhD in any of the following: Meteorology, Agrometeorology, Hydrometeorology

2. DEPARTMENTAL STATISTICS (*Given at end of academic year*)

i. Enrolment of Undergraduates

Year 1	62
Year 2	50
Year 3	31

## ii. Results of finalist students

Thirty five (35) 4<sup>th</sup> year students sat for examinations and 30 passed and graduated on 18<sup>th</sup> September, 2009

## iii. Postgraduate:

## (a) PGD

There were six (6) students registered for postgraduate diploma in meteorology

## (b) M.Sc.

MSc in Meteorology I 5

MSc in Meteorology II 3

MSc in Agrometeorology I 1

(c) PhD 7

## 3. COMPLETE STAFF LIST 2008/09

Designation	Name
Professor	Prof. Laban A. J. Ogallo
Associate Professor	Prof. John K. Ng'ang'a
	Prof. Francis M. Mutua
	Prof. Muthama Nzioka J
Senior Lecturer	Dr. Raphael E.A. Okoola
	Dr. Fredrick K. Karanja
	Dr. Joseph R. Mukabana
	Dr. Joseph M. Ininda
	Dr. Christopher Oludhe
	Dr. Alfred O. Opere
Lecturer	Dr. Gilbert O. Ouma
	Dr. Franklin K. Opijah
	Dr. Joseph Nzau Mutemi
	Mr. Cromwell B. Lukorito
Tutorial Fellow	Mr. Wilson Gitau
Secretary	Mrs. Fidelis N. Mburu
	Ms Rosemary M. Muindi

Chief Technologist	Mr. Watitwa B. Masieyi
Senior Technologist	Mr. Duncan N. Kariithi
	Mr. Joshua A. Koriga
	Mr. Godfrey Shem Juma
Technologist	Mr. Fredrick Otieno Owino
Trainee Technologist	Miss Dorcus Kalondu Mule
Laboratory Attendant II	Mr. Patrick M. Kaunga

### Staff Changes

- (a) *Promoted to Senior Lecturer positions:* Dr. Christopher Oludhe and Dr. Alfred O. Opere
- (b) *New Appointments:* Mr. Wilson Gitau, Mr. Godfrey Shem Juma, Mr. Fredrick Otieno Owino and Miss Dorcus Kalondu Mule

#### 4. VISITORS

DATE	NAME OF VISITOR	ADDRESS
11/11/2008	Dr. Jorg Klausen	Empa, 8600 Dribendorf, Switzerland
11/11/2008	Dr. Stephan Heme	Empa, 8600 Dribendorf, Switzerland
19/11/2008	Michael Karue	ISO IQA Auditor - University of Nairobi
19/11/2008	Dr. M.R.B. Otieno	ISO IQA Auditor - University of Nairobi
9/12/2008	Dr. Joseph R. Mukabana	Box 30259 - 00100, Nairobi
09/12/08	Stephen J.M. Njoroge	WMO Regional Representative
09/12/08	Nicholas W. Maingi	Kenya Meteorological Department, Box 30259 - 00100, Nairobi
09/01/09	T.E. Mrutu	Tanzani Met Agency, Box 3056, DSM
09/01/09	Stella Aura	Principal, IMTR/WMO - RTC Box 30259-00100 Nairobi
09/01/09	Samuel W. Kahuha	Kenya Meteorological Department, Box 30259 - 00100, Nairobi
29/01/2009	Biuetou Diague	BP 3738 Dakar, Senegal (ENDA)
26/03/2009	Simon T. Gathara	Kenya Meteorological Department, Box 30259 - 00100, Nairobi
11-2-2009	KEBS Surveillance Auditors	
26/03/2009	Onesmus Kamukwa	Kenya Meteorological Department, Box 30259 - 00100, Nairobi
26/03/2009	Chanzu Benard	Kenya Meteorological Department, Box 30259 - 00100, Nairobi
26/03/2009	Peter M. Bundi	Kenya Meteorological Department, Box 30259 - 00100, Nairobi
16/06.2009	Dr. S. Marigi	Kenya Meteorological Department, Box 30259 - 00100, Nairobi
16/06/2009	John Aseyo	Kenya Meteorological Department, Box 30259 - 00100, Nairobi
16/6/2009	Peter M. Bundi	Kenya Meteorological Department, Box 30259 - 00100, Nairobi
21/07/2009	Dr. Charles K. Gutebe	Code 6132, NASA Goddond Greenbelt, MD 20703
24/07/2009	Prof. S.B.B. Oteng'i	Masinde Muliro, Box 190 - 50100, Kakamega
13/10/2009	Dr. Julius Wellens-Mensah	Hydrological Services Dept., Accra, Ghana
13/10/2009	Dr. Yinka Adebayo	WMO, Geneva, Switzerland
13/10/2009	Ms Stella Aura	Principal, IMTR/WMO - RTC

#### 5. CONFERENCES, WORKSHOP & SYMPOSIA (*Include paper(s) presented*)

Prof. N.J.Muthama

- The 2<sup>nd</sup> Lake Victoria Basin Annual Stakeholders Forum held on 27 – 28 October 2009 at the Tom Mboya Labour College, Kisumu. On the occasion of celebrating the 10<sup>th</sup> Anniversary of the East African Community. Presented a paper on "*Implications of climate change on natural resources (water, land, fisheries) management in the Lake Victoria Basin*"
- Regional preparedness forum to develop strategies for reducing the negative impacts of the evolving el-Nino. Workshop held at Kisumu from 19 to 21 October 2009 under the auspices of ICPAC, GFDRR, UNISDR, WMO, FEWSNET & Red Cross

- IPCC WGI/WGII Expert Meeting on Detection and Attribution Related to Anthropogenic Climate Change: 14-16 September 2009, Geneva Switzerland
- The attitude change for adaptation to climate change workshop, Kisumu 3-6 November 2008 (*Nile Basin Initiative*)
- Training Seminar on the Management of Meteorological Training Institutions, Langen, Germany, 20 to 24 October 2008
- National Stakeholders' Workshop on Evaluation of Socio-economic Benefits of Meteorological information and Services in Kenya, 25-9-2009

#### Prof. F.M. Mutua

- International Symposium: Local Practices of Integrated Flood Risk Management, 30-9-2008, Tsukuba, Japan (ICHARM Public Works Research Institute)
- Nile Basin Development Forum (2008) in Khartoum, Sudan, 17-19 Nov 2008
- Nile Basin Universities' Forum (NBUF) Development Meeting (21-24 April 2009) Kigali, Rwanda
- Research Workshop for the Stochastic Modeling Component of the UNESCO-Nile Friend Project, Cairo, Egypt (30 May – 4 June 2009)
- First Nile Basin Capacity Development Forum. Dar es Salaam, Tanzania (8-10 June 2009)
- Nile Basin Universities Forum, Kampala, Uganda (12-19 June 2009)
- Scientific Steering Committee of the Nile Basin Research Program in Bergen, Norway (23-28 August 2009)

#### Dr Okoola

- National R & D Journal Stakeholders' Forum 20<sup>th</sup> – 22<sup>nd</sup> May, 2009 at KICC (Taifa Hall), Nairobi  
*THEME: Building a National Platform for Publishing and Disseminating Science, Technology and Innovation Findings*
- Institute for Meteorological Training and Research (IMTR) Editorial Board Retreat 20<sup>th</sup> – 25<sup>th</sup> April, 2009 at AICAD, Juja (Kenya). Purpose of the Retreat was to compile and prepare the Kenya Meteorological Department Research Report for the year 2008.

#### Dr. C. Oludhe

- WMO coordinated "International Expert Review Meeting on Regional Climate Outlook Forums" held in Arusha, United Republic of Tanzania, from 3 to 7 November 2008. Financial support from WMO
- United Nations Framework Convention on Climate Change (UNFCCC) technical workshop on integrating practices, tools and systems for climate risk assessment and management and disaster risk reduction strategies into national policies and programmes. Havana, Cuba (Hotel Melia Cohiba): 10 to 12 March 2009. Financial support from International Strategy for Disaster Reduction (UNSDR) Secretariat.
- The World Climate Conference-3 (WCC-3) from 31 August to 4 September 2009. Speaker in the expert session on Climate and sustainable energy, Geneva, Switzerland. Sponsored by WMO
- Experts Meeting for enhanced Application of Climate Products and Services in coping with Climate Variability and Adapting to Climate Change (24-8-2009), Geneva, Switzerland
- Inception Workshop on the Zambia Pilot Project in Lusaka, Zambia; 19 to 22 October 2009. Financial support from WMO

Dr. A.O. Opere

- 9<sup>th</sup> WaterNet Symposium and AGM, 29-31 October 2008. Birchwood/ Europrime Hotel, Johannesburg, Republic of South Africa. Source of Finance: WaterNet Secretariat
- Workshop on Implications of climate variability on water resources in Africa, 21-23 at the University of Cambridge, UK (Financial Support by Centre of Energy Studies of the Cambridge University)

Dr. Gilbert O. Ouma

- Training workshop: Climate variability and Predictions for South Asia, Eastern and South Eastern Africa in Hanoi, Vietnam from 22 to 29 June 2009. Financial support from University Corporation for Atmospheric Research, USA
- Adaptation to climate change: Strengthening Capacities in Africa workshop in Bonn, Germany, 25-28 November 2008. Funding from Germany Development Institute

Dr. J.N. Mutemi

- Research visit at UNESCO-IHE, the Netherlands from 1<sup>st</sup> October to 23<sup>rd</sup> December 2009. Funding by ACCION Project
- Nile Basin Research Conference in Dar es Salaam, Tanzania (8- 12 June 2009) at Sea Cliff Hotel. Source of funding Applied Training Project of the NBI
- Climate Modelling and Prediction Research at NCEP in Silver Spring, MD, USA (20<sup>th</sup> October to 19<sup>th</sup> December 2008. Financial support from NOAA

Mr. C.B. Lukorito

- Climate change and transboundary animal diseases, Imperial Beach Resort, Entebbe in Uganda. 13-16 October 2009
- *Climate risk assessment for agriculture, 17 – 21 august 2009, ICPAC, Kenya*
- *Greater Horn of Africa 24<sup>th</sup> climate outlook forum (GHACOF24), 24 – 25 August 2009, Inter-Continental Hotel, Nairobi, Kenya*

Mr. Watitwa B. Masieyi

- Participated in the Kenya In-country Evaluation and Dissemination Workshop on Higher Education Science and Curricular Reforms: African Universities Responding to HIV and AIDS held at Intercontinental Hotel, Nairobi on 8<sup>th</sup> December 2008 under the auspices of UNESCO and African Women in Science and Engineering (AWSE)
- Training for inspection and acceptance committee members held on Friday November 14, 2008 at UON Central Catering Unit
- Refresher training for internal quality auditors at Great Rift Valley Lodge, Naivasha from 4<sup>th</sup> to 7<sup>th</sup> November 2008
- Participant: Management and Secretarial staff training on customer care and public relations held on Saturday October 25, 2008 at SCI Corporate Laboratory

Mr. D. N. Kariithi

Participated in United Nations/Kenya/European Space Agency (ESA) Regional Workshop on *"Integrated Space Technology Applications for Monitoring Climate Change Impact on Agricultural Development and Food Safety"* Hosted by the Kenya Meteorological Department (KMD), Department of Resource Survey and Remote Sensing (DRSRS) in collaboration with the IGAD Climate Prediction and applications Centre (ICPAC) and the Regional Centre for Mapping of Resources for Development (RCMRD) and co-sponsored by ESA 1-5 December 2008, Nairobi Kenya (Mt. Kenya Safari Club)

6. OTHER ACTIVITIES & HONOURS (*Include paper(s) presented*)

- Two students supported under work study for needy students programme

- *Educational Field trips for postgraduate students*
  - (a) *Machakos, Kitui, Embu, Nanyuki, Nyahururu (11 to 16 May 2009)*
  - (b) *Kathonzweni (29-5-2009)*
  - (c) *Wote, Mombasa, Kwale and Malindi (20 to 24 June 2009)*
- MOU between the UON (Department of Geology and Department of Meteorology) and the Kenya Meteorological Department, Ministry of Environment and Natural Resources (August 2009)
- Department participated in UON open day held at Great Court from 4<sup>th</sup> to 6 June 2009

## 7. RESEARCH WORK COMPLETED DURING THE YEAR

- (a) Chabvunguma, Stanley David (MSc Thesis)– *Assessment of Maize crop water requirements and production under climatic change in Central and Southern Regions of Malawi*
- (b) Nyakwada, William (PhD Thesis)- *Predictability of East African Seasonal Rainfall with Sea Surface Temperature Modes*

## 8. PUBLICATIONS

## 9. TALKS, SEMINARS

- Walter A.E. Nganyi (Friday, 23<sup>rd</sup> October 2009)
  - Topic: Response of pigeon pea to phosphorus fertilizer under the climatic conditions of Eastern Province, Kenya*
  - MSc Research Project: *Final Progress Report*
- *Geoffrey Sabiiti (Monday, 28<sup>th</sup> September 2009)*
  - Topic: Application of Regional Climate Scenarios for Adaptation to Climate Change Impacts on Agriculture over Lake Victoria Basin: A Case Study of a Grain Crop Grown on the Uganda side of the Lake Basin*
  - PhD Proposal

S/N	Surname	First Name	Other Names	Reg. Number	Project Title	Supervisors
1	Changara	Abraham	Odari	I10/3124/2005	INVESTIGATING RELATIONSHIP BETWEEN RAINFALL AND BLOCKING INDEX	Prof. Muthama Dr. Ininda
2	Mue	Amos	Kitheka	I10/2490/2005	INFLUENCE OF WEATHER ON NAIROBI STOCK MARKET	Dr. Opere Prof. Muthama
3	Onyango	Augustine	Omondi	I10/2499/2005	ASSESSING THE SPATIAL AND TEMPORAL CHARACTERISTIC OF DROUGHT IN NORTH EASTERN PROVINCE	Prof. Ng'ang'a
4	Wekesa	Augustine	Mwanja	I10/2489/2005	ASSESSMENT OF SURFACE WINDS AND ITS IMPACTS ON AVIATION OPERATIONS AT THE JOMO KENYATTA INTERNATIONAL AIRPORT	Dr. Okoola Prof. Muthama
5	Gikunda	Boniface	Mwenda	I10/2501/2005	THE ROLE OF MADDEN-JULIAN OSCILLATION (MJO) IN DAILY RAINFALL PERFORMANCE OVER KENYA DURING APRIL 2009	Mr. Lukorito Dr. Mutemi
6	Wambua	Boniface	Musyoki	I10/2507/2005	ASSESSMENT OF WIND ENERGY POTENTIAL OVER THE COASTAL AREAS OF KENYA	Dr. Oludhe Dr. Opijah
7	Melabi	Claire		I10/2683/2003	UTILIZATION OF WEATHER PRODUCTS IN WESTERN PROVINCE	Prof. Ng'ang'a Dr. Mutemi
8	Cheruiyot	Collins	Kiprop	I10/3129/2004	TIDAL VARIATIONS OVER THE KENYAN COAST (KILIFI AND SHIMONI)	Dr. Ininda Ms Stella Aura
9	Koros	David		I10/3201/2005	AN ASSESSMENT OF HIGH RESOLUTION REGIONAL MODEL (HRM) PERFORMANCE IN SIMULATING RAINFALL OVER KENYA DURING 2005 TO 2006	Dr. Ininda Dr. Mutemi
10	Njiru	David	Muriithi	I10/3203/2005	IMPACTS OF CLIMATE CHANGE ON INFRASTRUCTURE DESIGNS ON RIVER TANA BASIN	Prof. Mutua Dr. Ininda
11	Nthiga	Dennis	Fundi	I10/2637/2004	ASSESSMENT OF DESERTIFICATION USING NORMALIZED DIFFERENCE VEGETATION INDEX (NDVI) IN KENYA	Dr. Ouma Dr. Opijah
12	Okwako	Duncan	Otieno	I10/2492/2005	TOWARDS PREDICTING RAINFALL IN KENYA USING THE RELATIONSHIP BETWEEN TOTAL OZONE AND GLOBAL SEA SURFACE TEMPERATURES	Prof. Muthama Dr. Oludhe
13	Bosire	Emily	Nyaboke	I10/2484/2005	INVESTIGATING THE EVIDENCES OF ANTHROPOGENIC CHANGES AND THEIR IMPACTS ON LAKE NAIVASHA LEVELS	Prof. Mutua Dr. Opere
14	Masambaya	F.	Ndukwe	I10/2483/2005	STUDY OF WIND POTENTIAL IN NORTH EASTERN PROVINCE FOR GENERATION OF ELECTRICITY	Dr. Oludhe Prof. Muthama
15	Karanja	Francis	Mugane	I10/3126/2004	INFLUENCE OF WEATHER ON THE PREVALENCE OF TYPHOID FEVER IN NAIROBI	Dr. Oludhe Prof. Muthama
16	Obuya	Gorrey	Achieng	I10/2480/2005	AN ASSESSEMENT OF THE RELATIONSHIP BETWEEN RESPIRATORY AILMENTS AND, INDOOR AND OUTDOOR AIR QUALITY	Prof. Ng'ang'a Prof. Muthama
17	Bakari	Hafidh	Juma	I10/7277/2005	ASSESSMENT OF VEHICULAR POLLUTION IN ZANZIBAR	Prof. Muthama Dr. Ininda



18	Simiyu	Harald	Adegu	I10/2505/2005	IMPACTS OF VOLCANIC ASH TO THE AVIATION INDUSTRY IN THE SOUTH-EAST ASIA SUB-CONTINENT ALONG THE SYDNEY SINGAPORE ROUTE	Dr. Okoola Prof. Muthama
19	Osumba	Hezron	Awour	I10/2504/2005	Effects Of Fog And Rainfall As Weather Parameters Influencing Road Traffic Accidents In Nairobi	Dr. Oludhe Dr. Opijah
20	Rotich	Isaac	Kimutai	I10/2502/2005	Investigation on Levels of Surface Ozone Concentration and its Effect on Health in Nairobi City	Prof. Muthama Dr. Oludhe
21	Ochieng	Jacob	Apollo	I10/2494/2005	Developing a Malaria Early Warning System over Western Kenya by Using Sea Surface Temperatures in a Predictive Model	Dr. Ouma Prof. Muthama Dr. Mutemi
22	Mayunga	John	Wezza	I10/2855/2006	Signal and Possible Impact of Climate Change in Tanzania (A Case Study of Lake Victoria Basin)	Prof. Ng'ang'a
23	Njeri	Joseph	Karianjahi	I10/2493/2005	IMPACTS OF THE SEVEN FOLKS' DAMS ON RAINFALL PATTERNS IN THE SURROUNDING AREAS	Prof. Ng'ang'a Dr. Ouma
24	Wanjala	Joseph	Wafula	I10/2503/2005	INFUENCE OF CLIMATIC VARIABILITY ON TEA YIELD IN KERICHO DISTRICT	Dr. Oludhe Mr. Lukorito
25	Oulu	Julius	Ngoga	I10/2488/2005	ASSESSING THE POTENTIAL OF RAINWAETR HARVESTING IN NAIROBI	Prof. Mutua Dr. Opere
26	Kariuki	Micheal	Muchiri	I10/2477/2005	Use of Frequency wind rose to determine the Pollution Dispersion from a Continuous Point Source- The Case of Dandora Damp Site	Prof. Muthama Prof. Ng'ang'a
27	Musyoka	Miriam	Mwende	I10/2478/2005	Impacts of Climate Change on Tropical Cyclones over the Southern Indian Ocean	Dr. Ininda Prof. Ng'ang'a
28	Ngatia	Onesmus	Kimaru	I10/2486/2005	EFFECT OF RAINFALL VARIABILITY ON HYDRO-ELECTRIC POWER PRODUCTION	Dr. Opijah Dr. Opere
29	Okwoyo	Peter	Kegeza	I10/2485/2005	Application of the Linear Pertubation (LPM) Model to River Flow Foerecasting iln Upper Thika Catchment	Prof. Mutua Dr. Opere
30	Mwangi	Reuben	W.	I10/2491/2005	STUDY OF OZONE AND CARBON IN MT. KENYA GAW STATION	Prof. Muthama Prof. Ng'ang'a
31	Nguma	Ruth	Katui	I10/2506/2005	INVESTIGATING THE EVIDENCES OF ANTROPOGENIC ACTIVITY AND THEIR EFFECTS ON LAKE VICTORIA LEVELS	Prof. Mutua Dr. Opere
32	Kimaita	Samuel	Bundi	I10/2487/2005	Investigating the Effects Of Vegetation Degradation Over Mau Water Towers On The Discharge Of River Mara	Prof. Mutua Dr. Ouma
33	Kimani	Sarah	Wanjiku	I10/2495/2005	Impacts of industrialization and urbanization on the water quality in kenya. Case study: nairobi river	Dr. Opere
34	Ongoma	Victor		I10/2496/2005	AN INVESTIGATION OF THE EFFECTS OF URBANIZATION ON CLIMATE OF NAIROBI CITY	Prof. Muthama Prof. Ng'ang'a
35	Muindi	Vincent	Munyao	I10/2498/2005	Relationship between lower stratospheric QBO on rainfall variability over the Greater Horn of Africa (GHA)	Dr. Opijah Dr. Ininda

### ***Current Research Activities***

The research activities in the department include;

- Climate variability and predictability using statistical and General Circulation Model (GCM) models
- Development of indices for monitoring and prediction of climate variability in Eastern Africa region
- Link between atmospheric aerosols, stratospheric dynamic, ozone and climate variability
- Effect of urbanization on micro-environment; Air pollution transport and dispersion, air quality modelling
- Climate change
- Drought and low flows in the Nile/Flow Regime for International Experimental Network Data (FRIEND) research program
- Mixed tree/crop interfaces in semi-arid environments
- Applications of Renewable Energy in Kenya.
- Applications of remote sensing in meteorology with particular emphasis on disaster management, hydrology, agriculture and environmental monitoring in support of sustainable food security
- *Synoptic Diagnostics and forecasting*

### ***Departmental Collaborations***

The Department of Meteorology collaborates with the WMO Regional Institute for Meteorological Training and Research (IMTR) based in Nairobi. The department also, maintains close links with the IGAD Climate Prediction and Application Centre (ICPAC). Other collaborators include; WMO, UNEP, UNDP, International Centre for Theoretical physics (ICTP), European Meteorological Satellite (EUMETSAT), University of Wales at Cardiff, North Carolina State University, Nile Basin Initiative (NBI), University of Oxford, Friedrich-Schiller-Universitat (Jena), University of Cape Town- South Africa and CRC- University of Bourgogne, France.

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